

Research Report 1233

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**AN APPLICATION OF HUMAN FACTORS CONCEPTS
TO AN INTERACTIVE COMPUTERIZED PERSONNEL
RECORD-KEEPING SYSTEM**

Thomas M. Granda

HUMAN FACTORS TECHNICAL AREA

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U. S. Army

Research Institute for the Behavioral and Social Sciences

January 1980

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER Research Report 1233 ✓	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) AN APPLICATION OF HUMAN FACTORS CONCEPTS TO AN INTERACTIVE COMPUTERIZED PERSONNEL RECORD- KEEPING SYSTEM		5. TYPE OF REPORT & PERIOD COVERED
7. AUTHOR(s) Thomas M. Granda		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Army Research Institute for the Behavioral and Social Sciences 5001 Eisenhower Avenue, Alexandria, VA 22333		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 2Q763743A774
11. CONTROLLING OFFICE NAME AND ADDRESS Army Institute for Research & Management Information and Computer Sciences (AIRMICS) Atlanta, GA		12. REPORT DATE January 1980
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) 12 63		13. NUMBER OF PAGES 52
		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) (14) ARI-RP-1233		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Man-computer interaction Real-time system procedures Human Factors Functional requirements Standard Installation/Division Personnel System (SIDPERS)		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report describes a "hands-on" demonstration that illustrates how human factors principles can be applied to the design of the human-computer interface and the operational procedures of an interactive, real-time Army personnel record processing system. The Standard Installation/Division Personnel System (SIDPERS) was identified as a typical record-processing system suitable for conversion to an interactive computer system. Four SIDPERS transactions (Duty Status, Departure, Arrival, and Grade Change) were selected as representative tasks for demonstrating the application of behavioral principles.		

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20. (continued)

The demonstration was programmed on the PLATO (Programmed Logic for Automatic Teaching Operation) system.

The demonstration focused on the interactions between the computer and both an experienced and an inexperienced processing clerk of a unit. The demonstration also displayed interactions between a unit supervisor and the computer and between SIDPERS personnel and the computer. The demonstration capabilities included error detection and correction, definition of terms, variable input format, and efficient information retrieval.

The hands-on demonstration clearly showed the advantages of an interactive system designed for the user: reduction in processing time and number of errors per transaction, accommodation to users with differing needs and levels of skill, and increased user satisfaction.

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TO AN INTERACTIVE COMPUTERIZED PERSONNEL
RECORD-KEEPING SYSTEM**

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Office, Deputy Chief of Staff for Personnel
Department of the Army

January 1980

Army Project Number
2Q763743A774

Interactive Computer Systems

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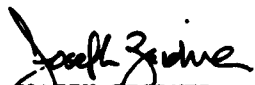
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FOREWORD

The Human Factors Technical Area of the Army Research Institute (ARI) is concerned with human resource demands of increasingly complex battlefield systems used to acquire, transmit, process, disseminate, and utilize information. This increased complexity places great demands upon the operator interacting with the machine system. Research in this area focuses on human performance problems related to interactions within command and control centers as well as issues of system development. The research program includes both technology base and advanced development research as well as a limited amount of technical advisory service (TAS) to Army agencies and activities. The general purpose of TAS is to provide immediate consulting assistance in meeting short-term priority requirements.

One area of special interest involves the development of functional design requirements for real-time, interactive systems to improve their usability by Army personnel. This report is a by-product of a TAS effort for the Army Institute for Research in Management Information and Computer Sciences (AIRMICS), Atlanta, Ga. in FY 1978. The U.S. Army Computer Systems Command (USCSC), of which AIRMICS is a part, has a requirement to convert many of its batch-oriented and semiautomatic systems to real-time, interactive systems. To demonstrate the potential utility of human factors design principles, ARI developed a working demonstration of an interactive, real-time record-keeping system. The Standard Installation/Division Personnel System (SIDPERS) was chosen as a representative system. This report briefly describes that demonstration. Highlighted are the potential job simplification and consequent reduced personnel demands which can be obtained with real-time interactive systems designed with attention to user requirements as well as functional requirements.

This effort is responsive to requirements of Army Project 2Q263743A774 and to a specific request for TAS from the U.S. Army Computer Systems Command. The preliminary human factors analysis was performed by ARI after discussion with Louis Sernovitz and other AIRMICS personnel and personnel from USCSC, SIDPERS, and the Military Personnel Center (MILPERCEN). David V. Meller at the Computer Engineering Laboratory at the University of Illinois implemented the specifications for the demonstration.


JOSEPH ZEIDNER
Technical Director

AN APPLICATION OF HUMAN FACTORS CONCEPTS TO AN INTERACTIVE COMPUTERIZED PERSONNEL RECORD-KEEPING SYSTEM

BRIEF

Requirement:

To demonstrate how human factors principles such as feedback, error correction, and positive reinforcement can be applied to the design of the human-computer interface and the operational procedures of an interactive, real-time Army personnel record processing system.

Procedure:

The Standard Installation/Division Personnel System (SIDPERS) was identified as a record-processing system suitable for conversion to a real-time interactive system. Four SIDPERS transactions (Duty Status, Departure, Arrival, and Grade Change) were selected as representative tasks for demonstrating the application of behavioral concepts and principles. Each transaction was analyzed to identify critical task elements and appropriate design concepts. A hands-on demonstration of real-time interactive procedures for the selected transactions was programmed on the Programmed Logic for Automatic Teaching Operations (PLATO) system.

Product:

The demonstration is concerned primarily with the interaction between the computer and both an experienced and an inexperienced unit processing clerk. The demonstration also displays the interaction between a unit supervisor and the computer and between SIDPERS personnel and the computer. The demonstrated system capabilities include error detection and correction, definition of terms, variable input format, and efficient information retrieval.

The demonstration clearly showed the advantages of a real-time interactive system designed for specific types of user. These advantages include: reduction in processing time and number of errors per transaction, accommodation of different user types and skill levels (e.g., inexperienced and experienced processing clerks), and increased user satisfaction.

Utilization of the Demonstration:

The demonstration can be used in the "hands on" mode to clarify both the role of human factors in the analysis of user requirements and the application of human factors principles and techniques in the design of interactive systems. The demonstration method itself can be used as an interactive test bed for determining the feasibility and value of alternative interactive procedures and techniques.

AN APPLICATION OF HUMAN FACTORS CONCEPTS TO AN INTERACTIVE COMPUTERIZED
PERSONNEL RECORD-KEEPING SYSTEM

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AN APPLICATION OF HUMAN FACTORS CONCEPTS TO AN INTERACTIVE COMPUTERIZED PERSONNEL RECORD-KEEPING SYSTEM

INTRODUCTION

The United States Army has one of the largest record-keeping tasks in the world. It must keep up-to-date records on personnel (e.g., their location, skills, education level, and past military record), weapons and equipment (e.g., physical specifications, research and maintenance data, supply and demand information), and other items such as food, clothing, computers, and housing. The Army's personnel record-keeping system has been converted from manual to semiautomatic operations and in the near future will progress to real-time, interactive computer operations. The Army's interest in real-time interactive systems results from their potential cost savings and increased efficiency. Many of the present manual and semiautomatic systems are characterized by long turnaround times, excessive errors, and the high personnel costs associated with many highly trained operators.

Many design options and alternatives are available for the development of a real-time interactive personnel record-keeping system. Some are costly, others are not; some are complex, others are simple. Many possible trade-offs are plausible. The system must be analyzed carefully and behavioral guidelines must be applied in order to determine the optimum level of hardware and software complexity to meet the needs of the operator and to keep system costs and complexity, as well as operator training and skills, at reasonable levels. The purpose of this project was to demonstrate a working model of a potential interactive, real-time record-keeping system in order to provide a "hands-on" demonstration of input/output procedures and software techniques that can aid operators and users. No attempt was made to devise a complete system. The Standard Installation/Division Personnel System (SIDPERS), a current semiautomatic Army personnel record-keeping system, was chosen as the context in which to demonstrate the procedures.

This report describes technical advisory service provided to the US Army Institute for Research in Management Information and Computer Sciences (AIRMICS). The report provides a brief description of the current SIDPERS and potential application of interactive techniques in SIDPERS, and a detailed description of selected real-time transactions in the SIDPERS demonstration.¹

¹The interested reader is encouraged to contact the Human Factors Technical Area at ARI (202) 274-8905 (AV: 284-8905) for a live demonstration of the SIDPERS interactive processing described in this report.

SIDPERS

Operationally, SIDPERS is part of the Army's Personnel Information System (PERSINS), designed to create, maintain, and update the Department of Army (DA) Form 2. Toward this end the standard personnel data record reporting system provides a two-way flow of personnel information between reporting organizations at the unit level, the Military Personnel Accounting Activity (MILPAC), and HQDA.

The basic actions currently taken to process a person who has already left one unit and is arriving at a new unit (i.e., an arrival transaction) are illustrated in Figure 1. Typically, when a person transfers from one unit to another he or she reports first to the military processing office, and then to the unit clerk. The reporting person usually carries his or her own forms and documents. The unit clerk gathers those documents which are needed to process the arrival of the new unit member (Figure 1, Symbol 1), extracts all the needed information, and records the data onto computer coding sheets (Figure 1, Symbol 2). The unit chief checks the clerk's work (Figure 1, Symbol 3) and provides feedback if there is any discrepancy between the information on the personnel records and the information on the coding forms. If the unit chief is satisfied with the information on the computer coding forms, the unit clerk transfers the data to mark-sense (optical scan) forms (Figure 1, Symbol 4). The mark-sense forms are sent to a processing center to be read and transformed into punched cards (Figure 1, Symbol 5). The punched cards are then sent to another location where they are read into and processed by the computer (Figure 1, Symbol 6). The computer determines whether the information is acceptable (Figure 1, Symbol 7). For example, the computer verifies that alphabetic characters are not in numeric fields, and that required data are not missing. If the data are found acceptable, the "arrived" person is declared eligible for duty. If the data are not found acceptable, the processing must be restarted with the unit clerk (Figure 1, Symbol 2). The "arrived" person is not eligible for duty until the successful completion of the personnel processing cycle.

The current SIDPERS batch-processing system has a number of potential sources of error and delay which could be reduced by using an interactive system and taking advantage of knowledge of human capabilities and limitations. For instance, the information contained on the personnel forms is transferred four times during the processing cycle (from personnel forms to computer coding sheets to mark-sense forms to punched cards to computer storage). This process increases the probability of error as well as the total processing time. Human error is very likely in the transfer of data from personnel forms to computer coding

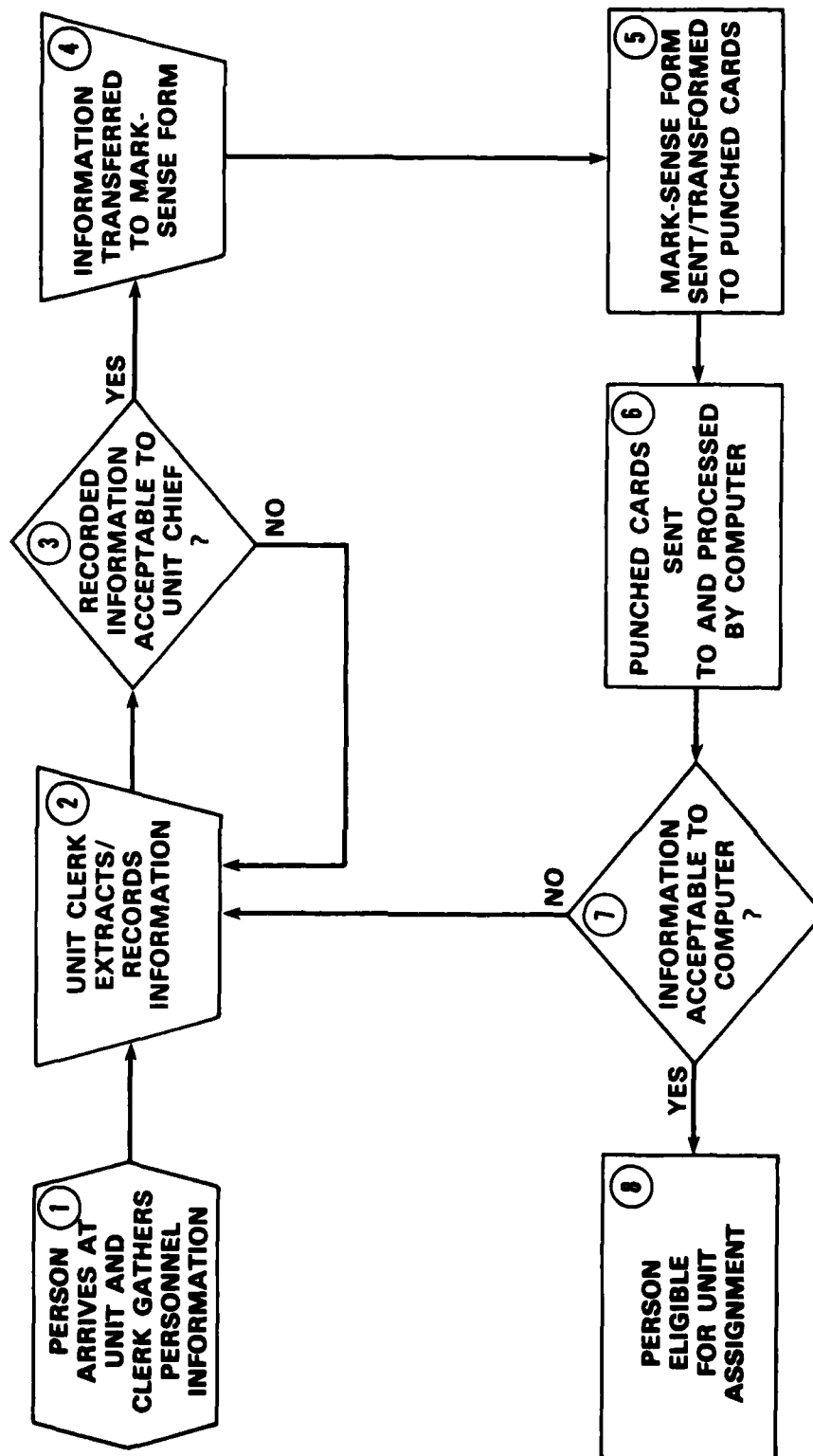


Figure 1. The basic steps taken to process arriving personnel in the current SIDPERS.

sheets and from the latter to mark-sense forms. Mistakes can be made both by the clerk who transcribes the information and by the supervisor who checks and proofreads it. The percentage of personnel data record transactions (e.g., departure, arrival, grade change) which must be reprocessed is very high (some estimates are as high as 80%). Total time to process a single personnel transaction is often much longer than necessary.

The transferral of data from mark-sense forms to punched cards and from punched cards to computer storage drastically increases processing time. It currently takes approximately three days (using conservative estimates) to process an arrival transaction. Typical delays include the following: The unit supervisor can hold the transcribed information before checking it; the unit supervisor may return the transcribed information for correction; the clerk may delay transcribing the information onto mark-sense forms; the clerk may be delayed in mailing or transporting the mark-sense forms to the processing center; the mark-sense processing center may have a backlog of forms to process; the mark-sense processing center may delay transportation of punched cards to the computer center; and finally, if the computer detects an error, the entire process must be restarted.

Complex and awkward personnel data processing not only decreases unit effectiveness, but also frustrates the individual military personnel who must wait for days to have their personnel records updated. The system can be especially frustrating when promotions, increases in pay, temporary duty assignments, or educational credits are involved.

POTENTIAL APPLICATION OF INTERACTIVE TECHNIQUES IN SIDPERS

The following description considers the types of interactive techniques and procedures available and how they might be applied in a real-time data-processing system for personnel record-keeping. It is not meant to include all phases of a potential interactive SIDPERS, nor is it meant to be other than a description of one of several possible approaches.

The interactive SIDPERS demonstration is based primarily upon the processing requirements of personnel clerks. However, it also considers briefly the requirements of unit supervisors and SIDPERS personnel (i.e., systems personnel). The clerks, usually assigned to a specific unit, input the necessary information into the system. They can be divided into two types, the experienced and the inexperienced. The demonstration accommodates some of the human-computer interface requirements for both experienced and inexperienced clerks.

To aid the unit supervisor, the demonstration provides for the retrieval of personnel records. It also shows the manner in which SIDPERS personnel may alter what the input clerk sees on the interactive display.

SIDPERS contains approximately 40 different transaction types. Four transaction types were selected as representative with respect to complexity, frequency of use, error rate, and transaction size (i.e., the number of input characters and elements entered per transaction). For each transaction type several fictitious personnel records were created. These records consist of the filled-in forms which the unit clerk would ordinarily have in order to process the transaction. Appendixes A, B, C, and D contain fictitious personnel records for four individuals, one for each transaction type. The four transaction types selected for the demonstration were:

- a. Duty Status Transaction - Required whenever a person acquires a new duty status (e.g., present for duty, sick leave, travel duty). See Appendix A for a sample set of duty status records.
- b. Departure Transaction - Required when a person leaves a unit for another unit. See Appendix B for a sample set of departure records.
- c. Grade Change Transaction - Required whenever a person changes grade, including demotion as well as promotion. See Appendix C for a sample set of grade change records.
- d. Arrival Transaction - Required when a person arrives at a new unit after having left his or her old unit. This transaction does not cover persons who have just entered the Army and are being assigned for the first time. See Appendix D for a sample set of arrival records.

The capabilities utilized in the interactive real-time SIDPERS demonstration are based on a behavioral analysis of the potential trouble spots that would interfere with or hinder the user or clerk in interacting effectively with a real-time SIDPERS. The individual elements of each of the transaction types were analyzed to determine such items as the procedures and data required for successful task performance and likely sources of error and confusion.

Potential clerk problems and difficulties (especially for naive users) are illustrated by the following questions compiled during the analysis:

What data should I input next?

Where is the information/data requested by the computer located?

How should I input the data? (i.e., What is the input format?)

Will the computer accept one and only one way of inputting the data?

Where on the screen should I input the data?

What are the meanings of certain terms and abbreviations used by the computer?

Are there errors in the input data?

Where is the error?

What is the nature of the error?

How can I correct the error?

Can I change an entry even if the computer doesn't recognize an error?
How?

Is the computer processing my input or is it waiting for me to do something?

Can I input data as fast as I want to or must I always keep the same pace?

What should I do if I'm completely lost?

Unit supervisors and SIDPERS personnel have additional concerns illustrated by the following questions:

What are the qualifications of a person newly arrived at the unit?

How do I access personnel information?

How can I obtain only the information I want without irrelevant or excess information?

Who made the changes to a certain personnel record? When and where were they made?

How can codes, terms, information items, screen organization, etc., be changed, added, or deleted in the system?

From the analysis of the task processing requirements, specific techniques to aid the user were identified (Alter, 1977; Chamberlain, 1975; Chapanis, 1965; Engel and Granda, 1975; Foley, 1974; Kennedy, 1975; Newman, 1966). These include error detection and correction, prompting,

user feedback, memory aids, and perceptual organization of display screens. The computer will not allow the user to proceed until a computer-detected error is corrected. However, the computer makes correction easier by providing error messages which describe the specific error, where it occurred, and the actions required to correct it and proceed with the transaction. User feedback is used to minimize input error rate and to make it easier for the user to recover from an error. Timely feedback is also important for smooth transaction flow; continuing feedback (i.e., the computer acknowledging the user's input) on a timely basis provides the user with a sense of continuity.

Memory aiding was also used in the demonstration. In a system as large as SIDPERS, terms, abbreviations, and codes are forgotten even by experienced, frequent users. The demonstration enables the user to ask the computer to define words, phrases and abbreviations.

Display techniques used in the demonstration include menu selection, touch-panel, function keys, and display highlighting. The use of certain function keys, for example, enables the computer to refresh a user's memory or to instruct a naive user on the proper terminology, input format, or error-correction procedures.

The PLATO (Programmed Logic for Automatic Teaching Operations) system² was chosen for the demonstration because it has the versatile software necessary for interaction, and because it provided the means to produce the demonstration at low cost, in a reasonable time.

See Figures 2 and 3 for a picture of the PLATO terminal and a diagram of the PLATO keyboard. The features of the PLATO software lend themselves well to the interactive, real-time approach. For instance, the PLATO system provides a very fast response time, a maximum of 1-2 seconds. Also, the PLATO system allows a word or group of words (i.e., input) to be stored in a buffer so that during correction or rewording, one letter, one word, or a group of words can be recovered without having to re-enter each character. Another time-saving feature allows capitalization, spaces, and symbols to be ignored.

In general, the design of this demonstration and the procedures utilized were based on a conscious effort to maximize the "aiding" to the user within the limits of reasonable cost and software flexibility.

²The use of the PLATO system does not constitute endorsement by the US Army or ARI.



Figure 2. The PLATO terminal

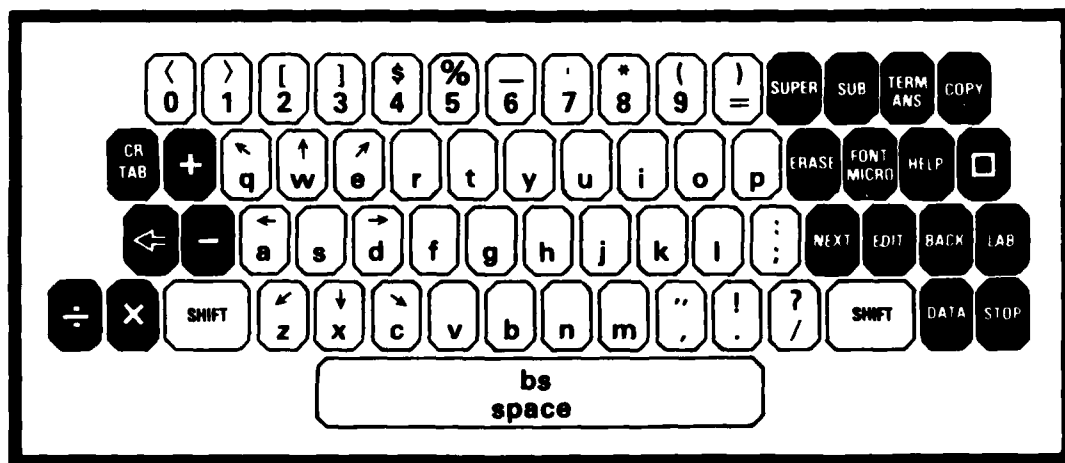


Figure 3. The PLATO keyboard

INTERACTIVE SIDPERS: SELECTED TRANSACTIONS

The interactive SIDPERS processing flow is essentially the same for all transactions. Figure 4 illustrates the basic steps necessary for interactive processing of an arrival transaction. By comparing Figures 1 and 4 it is clear that in the real-time mode fewer people are involved in processing the information. Only one person is needed to extract the information from the personnel data files and input the information into the computer via the PLATO keyboard. This process considerably decreases the total transaction processing time. The effect of changing from batch to interactive processing, in terms of the alternative transaction sequences (Figures 1 and 4), is to reduce the number of individual steps in processing the transaction and the amount of "paper shuffling" required; i.e., four processing steps (Symbols 3, 4, 5 and 6 of Figure 1) are replaced by one step (Symbol 3 of Figure 4). This reduction illustrates the potential personnel saving of changing from a semi-automatic SIDPERS to a real-time, interactive SIDPERS.

This section describes portions of selected transactions in the demonstration in terms of what simulated typical users (i.e., clerks, unit supervisors, and SIDPERS personnel) saw and did in processing personnel transactions using an interactive SIDPERS. First, an experienced clerk's duty status transaction is illustrated, followed by an inexperienced clerk's processing of a departure transaction and parts of arrival and grade change transactions. The retrieval of personnel information by a unit supervisor is depicted using two data retrieval modes. Finally, the interaction between SIDPERS system personnel and the computer is illustrated by alteration of an arrival transaction screen.

Processing of a Duty Status Transaction by an Experienced Clerk

The first screen that the processing clerk saw is shown in Figure 5a. (This and the following figures were transcribed from images taken directly from the PLATO plasma display via a Varian Printer, Model 30-V.) Figure 5b shows that the user entered, via the keyboard, both the name and the social security number of the person being processed. (See Appendix A for this individual's arrival records.) Entering the name and social security number is a two-step process. The clerk first input the name of the person being processed and then depressed the "next" key (after making most entries the "next" key must be depressed). Since that name was found in the SIDPERS data base, the computer requested the clerk to enter the social security number. (The fact that the name had been entered in small letters without spacing or a comma and was accepted by the computer illustrates the utility of having variable format capability.) Upon verification of the social security number for the entered name, the clerk continued processing the transaction.

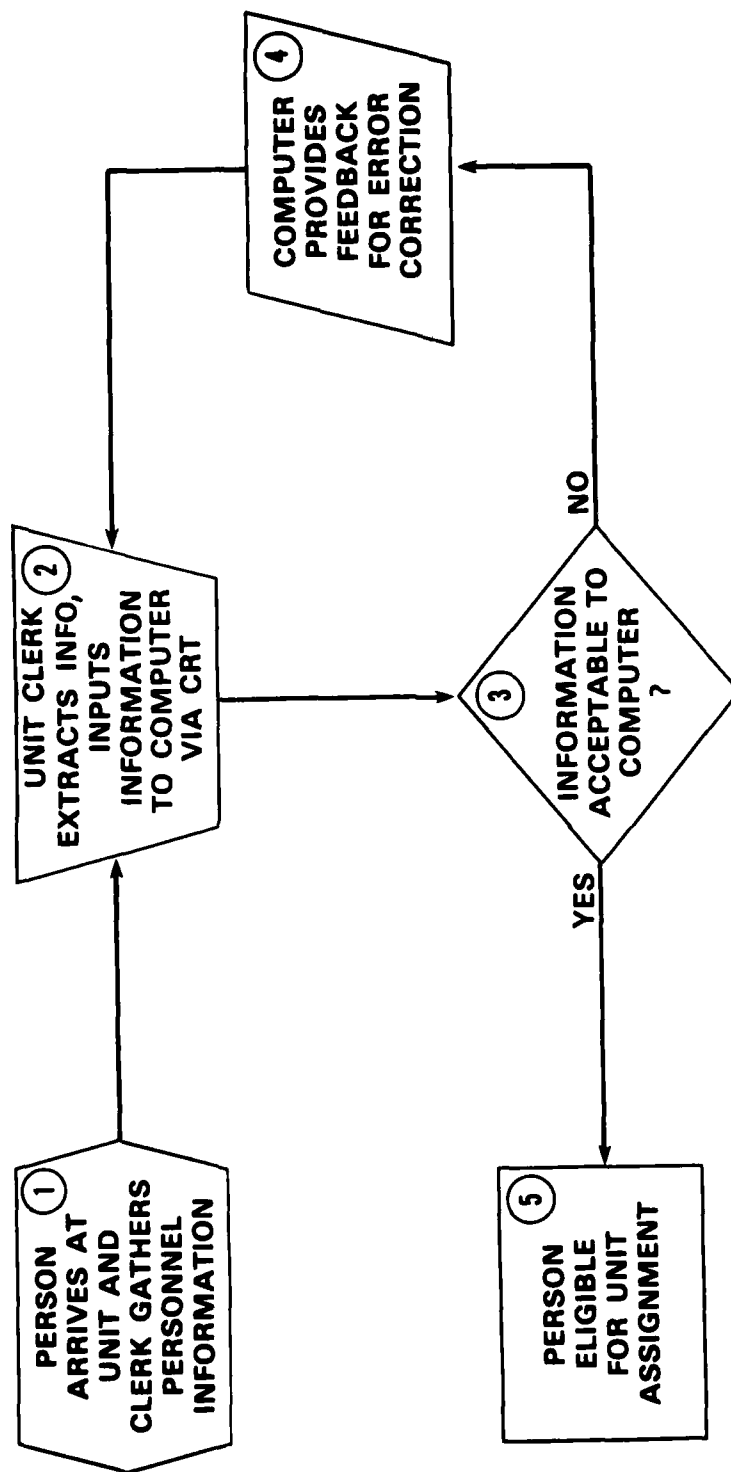
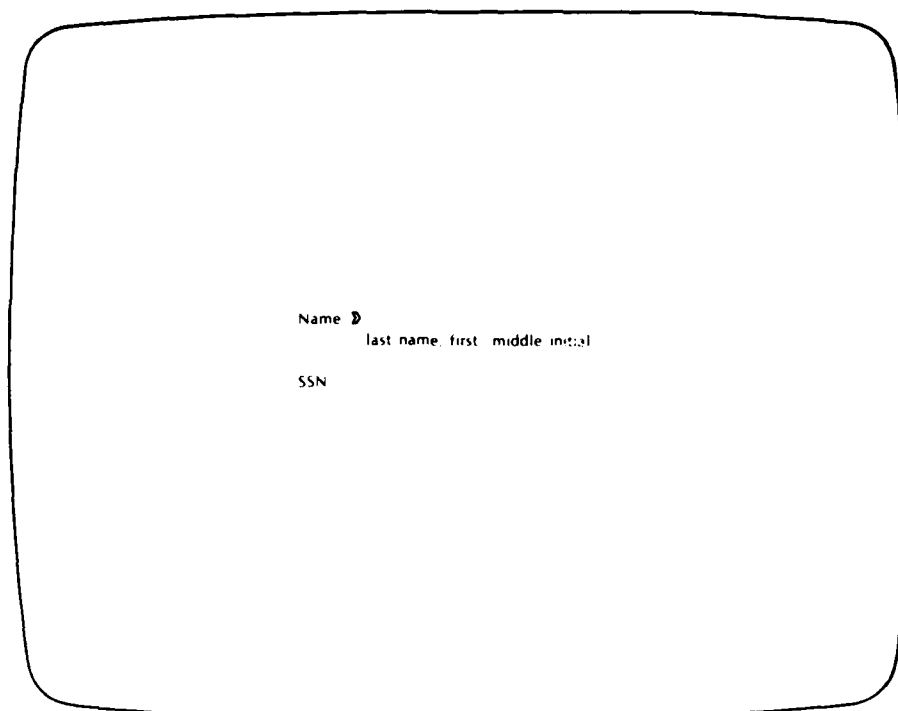


Figure 4. The basic steps necessary to process an arrival transaction in the interactive SIDPERS

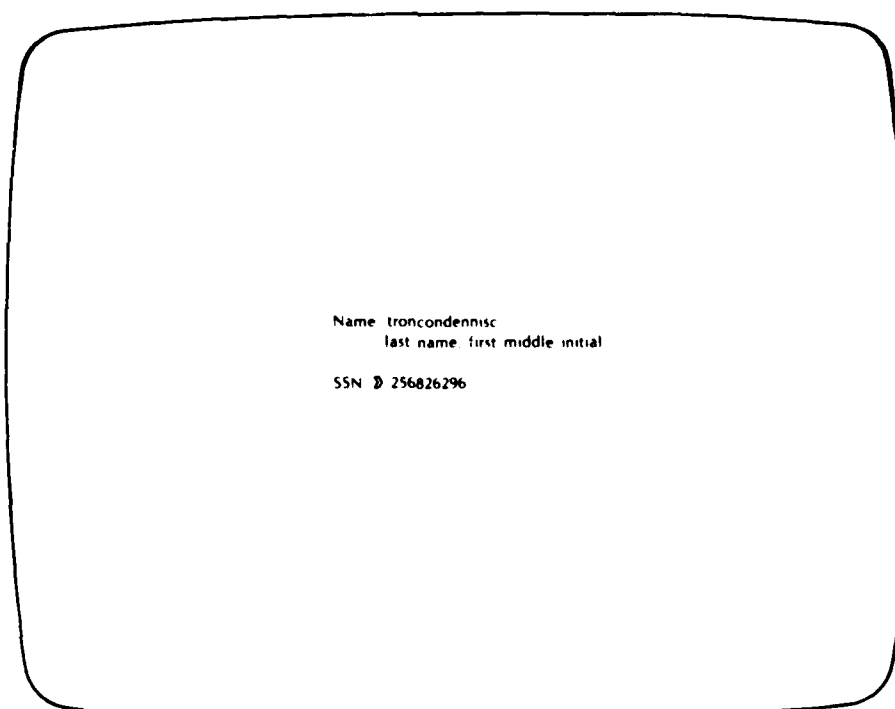


A screenshot of a computer terminal window with a rounded rectangular border. The window contains the following text:

Name
last name first middle initial

SSN

Figure 5a. Duty Status Transaction. Initial input screen



A screenshot of a computer terminal window with a rounded rectangular border. The window shows the data entered from the previous screen:

Name troncondennisc
last name first middle initial

SSN

Figure 5b. Duty Status Transaction. Name and social security number entries

Next, the computer requested the clerk to identify the type of transaction to be processed by selecting from a menu (Figure 5c). The clerk entered "ds" for "Duty Status," and Figure 5d, which asked the clerk for the "new duty status," automatically appeared.

The clerk then entered, at the top of the screen, the code designating a hospital stay (Figure 5e). After the clerk depressed the "next" key, the computer verified the validity of the code "hos," indicated it was acceptable, and asked for the next item (Figure 5f). Note that information the user entered appeared near the top of the screen before it was validated and in the middle of the screen after validation. (In the transactions to follow, this format changes several times to point out screen formatting flexibility.) After all the required entries in the duty status transaction had been input and accepted, the clerk was given three options, which appeared at the bottom of the screen (Figure 5g). The clerk could start the transaction all over again, edit one or more of the items, or send the information directly to the computer files.

Prompting was the only explicit aid that the experienced clerk was given. This is, the clerk was requested to provide a sequence of individual data items which he or she presumably quickly retrieved from the records and input to the computer. This sequential procedure may be too slow for a highly experienced clerk, especially for such a short transaction. The highly experienced clerk may prefer to enter the three items on one line as one continuous stream. In this case, the total arrival input would have been "hos1545780310." Although not part of the SIDPERS demonstration, the stream input procedure could easily be added. For instance, an experienced clerk who knew the required input sequence could depress a function key to let the computer know that the following input would be stream input. If that function key were not depressed the computer would assume that each data item was to be input separately. Regardless of the method used, the input would be verified by error-correction routines. (The verification process was not evident since all of the demonstration inputs were immediately accepted.)

Processing of a Departure Transaction and Parts of Arrival and Grade Change Transactions by an Inexperienced Clerk

The transaction started with an incorrect "name" entry resulting in an error message (Figure 6a). (See Appendix B for the fictitious personnel forms for James G. Smith.) After correction, the computer accepted the new input by signifying "ok" (Figure 6b). The computer aided the inexperienced user in two ways. First, it informed the clerk of an unverifiable name input and then it gave the clerk positive reinforcement when a verifiable entry was made.

Select Transaction

d	Departure
a	Arrival
ds	Duty Status
gs	Grade Change

Figure 5c. Duty Status Transaction, Menu selection of transaction type

DUTY STATUS
troncondennisc 256826296

new duty status D

d new duty status

Figure 5d. Duty Status Transaction. Request for "new duty status"

<u>DUTY STATUS</u>	
troncondennisc	256826296
new duty status ... » hos	
d new duty status	

Figure 5e. Duty Status Transaction. "new duty status" entry

<u>DUTY STATUS</u>	
troncondennisc	256826296
time of change »	
d new duty status	hos
t time of change	

Figure 5f. Duty Status Transaction. Acceptance of "new duty status" entry

DUTY STATUS
troncondennisc 256826296

d new duty status hos
t time of change 1545
a duty status date 780310

-- To start over (press STOP)
-- To change something (press EDIT)
-- To send info to computer (press COPY)

Figure 5g. Duty Status Transaction. A completed and accepted transaction

Name: D Smith, James J not found
last name, first middle initial
SSN

Figure 6a. Departure Transaction. Incorrect name entry

Name Smith, James G. ok
last name, first middle initial
SSN D

Figure 6b. Departure Transaction. Correct name entry

Name Smith, James G. ok
last name, first middle initial
SSN D 747-61-8121

Figure 6c. Departure Transaction. Social security number entry

After correcting the name input, the clerk entered the social security number (Figure 6c). Note that the formats for the name and social security number in Figure 6c are different than those entered in Figure 5b. The computer is programmed to permit variable input modes for both items. That is, for the name input it allows the user to include or skip spaces, commas, and periods and to use lower-case letters. The social security number can be input as a continuous string of nine digits or the digits may be separated by slashes (/), hyphens, or blanks. This variable input feature again displays the potential flexibility of an interactive system in adapting to nondestructive user idiosyncracies (i.e., those user input habits that do not affect input information).

After the clerk indicated that he or she was entering a departure transaction, the computer immediately requested the first entry in the departure transaction (Figure 6d). At this point the inexperienced clerk depressed the "help" key to find out what to do next. The computer then provided a message explaining where, in the accompanying personnel forms, to find the information (Figure 6e). The message states that the data will be found on DA Form 647-1, in the "OUT DATE" box, and that six numbers representing the year, month, date should be entered. The message also provided an example of the required data (780228) for the clerk. The clerk located the departure date in the records but, upon entering the date, inadvertently depressed the letter "O" key instead of the Zero "0" key. As a result the clerk received an error message after depressing "next" (Figure 6f). The error message informed the clerk that an error had occurred and that the input characters must all be numeric (the message also could have underlined the error to identify it).

After supplying the correct departure and report dates the clerk was asked to input the "movm. des. code (mdc)" (Figure 6g). The clerk did not know what "mdc" meant or what "movm. des. code" meant. Therefore the clerk depressed the "shift" key and then the "term ans" key and was immediately asked by the computer to input the term to be defined. The computer's query "what term?" is followed by the clerk's typed input "mdc" in Figure 6h. After the clerk depressed "next" he was given a definition of "mdc" (Figure 6i).

With the completion of the remaining departure inputs (the movement designator code, the gaining unit processing code, the number of days leave, the number of travel duty days, and the number of months overseas) the clerk was ready to send the information to the computer (Figure 6j). Let us assume, however, that the clerk had somehow reversed the departure and report dates. In that case the screen would have looked like that in Figure 6k. This figure differs from the previous figure in two ways:

DEPARTURE
Smith, James G
747618121
d departure date

departure date D

Figure 6d. Departure Transaction. "departure date" prompt

DEPARTURE
Smith, James G
747618121
d departure date

departure date D

Source: DA Form 647-1, "OUT DATE" box
Enter 6 numbers with
year, month, date in that order
for example: 780228

Figure 6e. Departure Transaction. "help" message for "departure date" entry

DEPARTURE
 Smith, James G.
 747618121

d departure date

departure date 780822 no
 Bad Character(s) - -
 Must be 6 numeric characters

Figure 6f. Departure Transaction. Error message for incorrect "departure date" entry

DEPARTURE
 Smith, James G.
 747618121

d departure date 780822
 r report date 780825
 m movm des code (mdc)

movm des code (mdc) 78

Figure 6g. Departure Transaction. "movement designator code" prompt

DEPARTURE
 Smith, James G
 747618121

d departure date	780822
r report date	780825
m movm des code (mdc)	

movm des code (mdc) »

what term? » mdc

Figure 6h. Departure Transaction. User's request for definition of "mdc"

DEPARTURE
 Smith, James G
 747618121

d departure date	780822
r report date	780825
m movm des code (mdc)	

movm des code (mdc) »

Movement Designator Code (MDC): indicates officer or enlisted travel, reason for the travel, and type of destination

Figure 6i. Departure Transaction. Definition of "mdc"

DEPARTURE
 Smith, James G
 747618121

d	departure date	780822
r	report date	780825
m	movm des code (mdc)	2b
g	gaining upc	wo49aa
l	number of days leave	2
t	number of tdy days	0
o	num months overseas	0

== > To start over (press STOP)
 == > To change something (press EDIT)
 == > To send info to computer (press COPY)

Figure 6j. Departure Transaction. A completed and accepted transaction

DEPARTURE
 Smith, James G
 747618121

d	departure date	780828
r	report date	780825
m	movm des code (mdc)	2b
g	gaining upc	wo49aa
l	number of days leave	2
t	number of tdy days	0
o	num months overseas	0

_____ Edit Item >

Figure 6k. Departure Transaction. Reversal of inputs for departure and report dates

the departure date and the report date are enclosed in rectangles to indicate that a logical error exists, and the edit option at the bottom of the screen appears automatically. Upon depression of the "d" key (for item d, departure date), and then the "next" key, a screen appears (Figure 6i) which explains that while the format for the departure entry was "ok," a conflict exists between the departure date and the report date. That is, the two entries enclosed in rectangles show James G. Smith as scheduled to report at his new unit before he is scheduled to depart his old unit. The error must exist in the departure entry or report entry or both. Upon correction of the errors through the edit feature, the final screen for the departure transaction is the same as shown in Figure 6j.

The detection of an error, such as the date conflict above, is not limited to data that appear simultaneously on the screen. For instance, when James G. Smith (who was previously processed as a departure) was later processed as an arrival, the clerk input an arrival date inconsistent with the departure date stored in computer memory. The clerk was notified of the conflict via the screen message (Figure 7a). The arrival date was subsequently corrected via the edit feature and the arrival transaction was completed (Figure 7b).

A comparison of Figures 7a and 7b with Figure 5f and with Figure 6i shows a different screen format for each of the three transactions. That is, the same entry type (e.g., the initial data entries, the final or accepted data entries, and the name and social security number) appears at different screen locations in different transactions. This illustrates the format flexibility, which may be used to accommodate the likes or dislikes of different clerks or the space constraints of different transaction types.

An example of input flexibility, particularly adaptable to the inexperienced user, was used midway through a grade change transaction. (See Appendix C for typical grade change records.) In order to input the "PMOS" (primary military occupational specialty), "how acquired" code, the clerk touched the portion of the screen over the appropriate letter code toward the bottom of the screen (Figure 8a). The computer accepted the "touch input," placed it in the appropriate position on the screen, and then asked for the next data item via touch input (Figure 8b). One advantage of a capability like touch input is that it serves as an alternative to keyboard input for those users who are either unsure of their typing skills or who are simply bored by the typing procedure.

The array of potential entry codes, whether input via touch or type procedures, can be constructed to consist only of logical, acceptable codes. For example, after the clerk input the "grade, promoted to" code, the computer asked for the "grade, how acquired" code (Figure 8c).

DEPARTURE
 Smith, James G
 747618121

d	departure date	780828
r	report date	780825
m	movm des code (mdc)	2b
g	gaining upc	wo49aa
l	number of days leave	2
t	number of tdy days	0
o	number months overseas	0

departure date D (

Edit Item d ok Current entry 780828
 Error Date Conflict -
 Must Report AFTER Departure

Figure 6i. Departure Transaction. Computer detection of date conflict and presentation of Edit capability to correct input errors

ARRIVAL
 smithjamesg
 747618121

a Arrival Date D 780811 no
 Date Conflict
 Must Arrive AFTER Dep
 arture
 Current Depart Date=
 78 08 22

Figure 7a. Arrival Transaction. Computer detection of a date conflict with an input made in a previous transaction

ARRIVAL

smithjamesg
747618121

780625 a. Arrival Date
wo49aa g. Gaining Unit Code
as23 p. Position Number

= = > To start over (press STOP)
= = > To change something (press EDIT)
= = > To send info to computer (press COPY)

Figure 7b. Arrival Transaction. Completed and accepted transaction

GRADE CHANGE

wolf ernest
444321198

d date of grade change 780623
p primary MOS 95b10
a add skill ID code 20
m pmos, how acquired

pmos, how acquired

A	B	C	D	F	G	H	I	P	S	U
---	---	---	---	---	---	---	---	---	---	---

Figure 8a. Grade Change Transaction. Touch input screen for "pmos, how acquired" code

<u>GRADE CHANGE</u>		wolf ernest 444321198
d date of grade change	780623	
p primary MOS	95b10	
a add skill ID code	20	
m pmos how acquired	D	
g grade promoted to		
grade promoted to		
PV1 PV2 PFC SP4 CPL SP5 SGT SP6 SSG SP7 PSC SFC TSG MSGSCM CSM		

Figure 8b. Grade Change Transaction. Computer acceptance of touch input for "pmos, how acquired" code

<u>GRADE CHANGE</u>		wolf ernest 444321198
d date of grade change	780623	
p primary MOS	95b10	
a add skill ID code	20	
m pmos, how acquired	D	
g grade promoted to	plc	
h grade, how acquired		
grade, how acquired		
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> D E </div>		

Figure 8c. Grade Change Transaction. Presentation of logically acceptable inputs only

Although other "grade, how acquired" codes exist, the computer determined that only "D" and "E" were logically possible. The advantage of this technique is that it reduces the potential for input error by reducing the input choices to valid entries. The disadvantage is that any listed item will be acceptable to the computer, so that if a mistake is made at this point (if, for instance, "E" were selected from the screen in Figure 8c), the computer could not detect that "E" was, in fact, an error.

The final screen for the grade change transaction is shown in Figure 8d. Note again that the formatting and locations of the grade change transaction elements in this display are different from the elements in previous transaction displays.

Retrieval of Personnel Information by a Unit Supervisor

Figure 9a depicts a partial record for a fictitious person identified by a unit supervisor. The record screen displays only the data contained in the four SIDPERS transactions that were used in this demonstration. A similar personnel supervisor aid, a trace feature, displays the last six duty status transactions in that individual's personnel record, in chronological order (Figure 9b). The first line in the last duty status transaction entry on this list, item 120, informed the SIDPERS supervisor who made the entry (tom g), the name of the organization or agency the clerk was in (ARI), the date the entry was made (781205) the time of day of the entry (0848), and the physical location of the input terminal (site 727). The second line of the last entry (the underlined portion) listed the duty status entries themselves. For duty status transactions processed before those listed in Figure 9b, the supervisor need only have depressed the "back" key. As mentioned, Figure 9b listed the last six entries made for the duty status transaction. The trace may include only one transaction type or a set of transaction types.

The record and trace features can be very helpful to unit commanders and unit supervisors concerning personnel decisions and assignments. For example, when new personnel must be assigned, vacancies occur, or special projects must be staffed, supervisors can retrieve the records of pertinent personnel (via the record or trace feature) in order to help them make their personnel assignment decisions.

Alteration of System Procedure or Format by SIDPERS Personnel

In any large system, user codes must be occasionally deleted from, changed, or added to an existing list. This procedure can be accomplished in the demonstration relatively easily via a screen like the one in Figure 10. All the current legitimate duty status codes are listed. At the bottom of the screen any of the three options (add, delete, or change) can be executed.

GRADE CHANGE

wolf ernest
444321198

d. date of grade change	780623
p. primary mos	95b10
a. add skill ID code	20
m. pmos, how acquired	D
g. grade promoted to	pfc
h. grade, how acquired	D

= = > To start over (press STOP)
= = > To change something (press EDIT)
= = > To send info to computer (press COPY)

Figure 8d. Grade Change Transaction. Final screen

Name	milletalbertc
SSN	978176264
Depart Date	78/06/09
UPC	34in67
Report Date	78/06/15
MDC	4s
Days Leave	3
Days TDY	0
Months OS	0
Arrival Date	78/06/15
Position Number	54
Duty Status	PDY
Time of Change	2130
Date of Duty Status	78/03/26
Grade	SGT
Grade How Acquired	E
Date of Rank	78/10/13
Primary MOS	11C50
Additional Skills	55
P. MOS How Acquired	P

Figure 9a. Personnel Information Retrieval. A partial record for a fictitious person identified by a unit supervisor


```

milletalbertc 978176264

110) by (tom g/ari) on 781205 at 0815 from 727
Duty HOS, 1350, 770227

111) by (tom g/ari) on 781205 at 0819 from 727
Duty PDY, 0945, 770304

114) by (tom g/ari) on 781205 at 0829 from 727
Duty TDY, 1600, 770616

115) by (tom g/ari) on 781205 at 0830 from 727
Duty PDY, 2030, 770804

119) by (tom g/ari) on 781205 at 0848 from 727
Duty TDY, 1000, 780130

120) by (tom g/ari) on 781205 at 0848 from 727
Duty PDY, 2130, 780326

** DONE **

```

Figure 9b. Personnel Information Retrieval. A chronological trace for the last six duty status transactions for an individual

```

Duty Status, Max = 27

1 ADM
2 ATC
3 AWC
4 AWL
5 CAP
6 CCA
7 CLV
8 CMA
9 DCH
10 DED
11 DFR
12 HOS
13 HOW
14 INT
15 KIA
16 MIA
17 MIS
18 OLV
19 PDG
20 PDY
21 REL
22 RET
23 RSG
24 SLV
25 TDY
a add      d delete    c change
D

```

Figure 10. Alteration Screen for SIDPERS Duty Status List

Sometimes it becomes necessary to change what the unit clerk sees on the display. For instance, display screens may require reorganization, definitions may need expansion or clarification, transaction items may require rewording, or input modes may need to be changed. To make input screen changes (to be seen by the clerk in processing transactions), SIDPERS personnel can interact with both a general option screen and a specific transaction option screen. On the general option screen, parameters are defined which apply to any or all of the transaction types in the demonstration. For instance, in the general option screen retrieved by the SIDPERS user (Figure 11a) line "a" states that touch input may be used for any or all of the four transaction types. Line "b" states that the name and social security number must be given to and verified by the computer before the specific elements of a transaction are entered. Other parameters specify such items as where on the screen the help and feedback messages are displayed, and where the touch input is located (if used). When the user depressed the "lab" key while the general option screen was displayed a screen resulted (Figure 11b) which graphically illustrates the effects of selecting parameters in the previous general screen. This latter type of display is useful to a format designer as a perceptual aid in creating or changing a transaction screen.

In order to alter a specific part of the arrival transaction display, the SIDPERS user retrieved the arrival transaction option screen (Figure 12a). Typical options on this screen, concerning the current transaction only, permit the user to specify where specific items are displayed on the clerk's screen the order of item presentation, and a security classification level for each item.

As an example of a wording change, the SIDPERS user was required to change the item phrase "Gaining Unit Code" to "Gaining UPC." The user entered "f," depressed "next," and entered "4" (Figure 12b). The note to the user at the bottom right of the screen defines the limits and characteristics of the input field for the item wording change. The item to be changed on the screen is underlined to clearly show the user which item is being changed. The user then typed in "Gaining UPC" and depressed "next." At this point the "Gaining Unit Code" was replaced by "Gaining UPC" which was erased from its original input location; and the input screen was readied for another possible wording change (Figure 12c). The user depressed the "lab" key, and a pictorial screen (Figure 12d) showed the user how the change would look to a transaction clerk. Figure 13 shows what the screen actually looked like when a transaction clerk attempted to process an arrival transaction after the wording change. (See Appendix D for a typical set of arrival transaction records.) Notice that line "g" now contains "Gaining UPC" and not "Gaining Unit Code" as in a previous arrival transaction (Figure 7b).

Mode Set "1tmg" = (* must be set)

*a Mode of Operation = touch
 *b Name Input Mode = N&SSN prior to Xn
 c Departure P set = dpt1tmg
 d Arrival P set = arr1tmg
 e Duty Status P set = ds1tmg
 f Grade Change P set = gc1tmg
 g Touch Highlight = circle
 h Locate Touch Area = 2701
 i Initial Show Item Names = as required for input
 j Show Item Name at "D" = yes
 k Relocate Data after Input = yes
 l Show HELP = yes
 m Where Show HELP = 1901
 n Show Feedback = yes
 o Where Show Feedback = 1
 p Show Terms = yes
 q Where Show Terms = 2301
 r Affirmative Judgement = "ok"
 s Negative Judgement = "no" & use fdbk mess
 t Date Delimiter = "

Figure 11a. General Option Parameters. Input screen

Touch

HELP -----
 HELP -----D-----
 TERMS
 TERMS
 TERMS
 FDBK
 FDBK
 FDBK

Figure 11b. General Option Parameters. Graphic illustration of the effects of the general option parameters

P-set "arrltmg" (* = must be set)

- *a. Type of Xn = Arrival
- *b. # items to be entered = 5
- c. where display name (if entered prior to Xn) = 220
- d. where display ssn (if entered prior to Xn) = 320
- *e. item identifier character
- f. name of item
- g. order of item input = nsagp
- h. where list item's "(id char) (name)"
- i. item's input medium
- j. where put item "D"
- k. where show item name at "D"
- l. where show item feedback
- m. where relocate item data after input
- n. confidential items

	-e-	-f-
1 Name	n	Name
2 SSN	s	Soc Secur Num
3 arr date	a	Arrival Date
4 gain upc	g	Gaining Unit Code
5 pos'n #	p	Position Number

Figure 12a. Arrival Transaction Option Parameters. Input screen

P-set "arrltmg" (* = must be set)

- *a. Type of Xn = Arrival
- *b. # items to be entered = 5
- c. where display name (if entered prior to Xn) = 220
- d. where display ssn (if entered prior to Xn) = 320
- *e. item identifier character
- f. name of item
- g. order of item input = nsagp
- h. where list item's "(id char) (name)"
- i. item's input medium
- j. where put item "D"
- k. where show item name at "D"
- l. where show item feedback
- m. where relocate item data after input
- n. confidential items

	-e-	-f-
1 Name	n	Name
2 SSN	s	Soc Secur Num
3 arr date	a	Arrival Date
4 gain upc	g	Gaining Unit Code
5 pos'n #	p	Position Number

f
4 20 char's max, open alpha-numeric f
D ield

Figure 12b. Arrival Transaction Option Parameters. The screen is ready to accept a substitution for the phrase "Gaining Unit Code"

P-set "arrltmg" (* = must be set)

*a Type of Xn = Arrival
 *b # items to be entered = 5
 c where display name (if entered prior to Xn) = 220
 d where display ssn (if entered prior to Xn) = 320

*e item identifier character
 f name of item
 g order of item input = nsagp
 h where list item's (id char) (name)
 i item's input medium
 j where put item Ⓚ
 k where show item name at Ⓚ
 l where show item feedback
 m where relocate item data after input
 n confidential items

	e	f
1 Name	n	Name
2 SSN	s	Soc Secur Num
3 arr date	a	Arrival Date
4 gain upc	g	Gaining UPC
5 pos n #	p	Position Number

Ⓚ Ⓚ

20 chars max open alpha numeric field

Figure 12c. Arrival Transaction Option Parameters. The phrase "Gaining Unit Code" has been changed to "Gaining UPC"

Arrival

n	(Name if prior entry)
s	(SSN if prior entry)

(a-data)	a	Arrival Date	Ⓚ
(g-data)	g	Gaining UPC	Ⓚ
(p-data)	p	Position Number	Ⓚ

a	fdbk
g	fdbk
p	fdbk

Figure 12d. Arrival Transaction Option Parameters. Graphic illustration of the effects of the arrival transaction option parameters

<u>ARRIVAL</u>	glassmartinr 599312563
780704	a Arrival Date g Gaining UPC >

Figure 13. Altered Arrival Transaction. Effect of wording change as seen by a transaction clerk

SUMMARY

To reduce the burden of inefficient record-keeping systems, the U.S. Army plans to convert many of its manual and semiautomatic record-keeping systems to interactive, real-time systems. To obtain the optimal level of hardware/software complexity, to meet operator and user requirements, and to keep system costs, system complexity, and operator training and skill requirements at a reasonable level, a careful analysis and application of appropriate behavioral, man-computer interface guidelines are required. A working version of a potential interactive real-time record-keeping system (the Standard Installation/Division Personnel System, SIDPERS) was created to provide a hands-on demonstration of input/output procedures and software techniques that can provide assistance to operators/users.

The behavioral techniques and procedures in the demonstration (e.g., feedback, error detection and correction, prompting, variable entry format, variable input modes) were integrated with user and operator requirements to produce an efficient interactive record-keeping system. It was successfully demonstrated that the human-factored, interactive system aided several types of users in a variety of ways. The system functioned as an instructive aid to the inexperienced user and as a memory aid to the experienced user by informing the user: where to find data and information; how to input the data; when errors occurred, what type of errors they were and how to correct them; what certain terms meant; and what inputs were acceptable to the computer. The computer served as a retrieval clerk for those users who needed access to information residing in the computer. The computer also acted as an organizer for the processing of SIDPERS transactions, retrieval of information, and alteration of the transaction clerk displays.

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APPENDIX A

AN EXAMPLE OF DUTY STATUS TRANSACTION RECORDS

BEFORE COMPLETING THIS FORM, SEE PRIVACY ACT STATEMENT ON REVERSE.

NAME (Last, first, middle initial) (Print or type)		GRADE		BRANCH	
Troncon, Dennis C		03		AG	
SIGNATURE		DATE			
SOCIAL SECURITY NUMBER		IN		OUT	
256-82-6296		DATE	TIME	DATE	TIME
				780310	1545
HOME STATION AND ORGANIZATION			AUTHORITY (SO, TO, type of pass)		
US Army Research Institute Alexandria, VA 22333					
TEMPORARY ADDRESS AND TELEPHONE NUMBER					
DeWitt Army Hospital, Rm 6N30, (202) 555-2391					
DESTINATION AND PURPOSE		DATE DUE TO RETURN		STATUS AND LENGTH OF STAY	
DeWitt Army Hospital Medical (hos)		N/A		N/A	

DA Form 647-1
1 May 76

Replaces DA Form 647-1, Dec 75
and DA Form 647-1R, (PAS),
Sep 75, which are obsolete.

PERSONNEL REGISTER
For use of this form, see AR 210-10, proponent
agency is MILPERCEN.

PRECEDING PAGE BLANK-NOT FILLED

APPENDIX A

PERSONNEL DATA - SIDPERS <small>For use of this form, see AR 600-1 the proponent agency is MILPERCEN.</small>					
DATA REQUIRED BY THE PRIVACY ACT					
AUTHORITY: PRINCIPAL PURPOSE(S): ROUTINE USES: DISCLOSURE:	Title 5, United States Code, Section 301. a. Permanent historical and legal document pertaining to the individual shown thereon during the period of assignment/attachment with a specific unit. b. Is the replacement document for the Morning Report (DA Form 1) for unit supported by the Standard Installation Division Personnel System (SIDPERS). a. Provide unit/PAC clerk with personnel information which, in conjunction with appropriate source documents enable the unit/PAC clerk to prepare SIDPERS change reports to update field and HQDA data bases. b. Recording of this change data on the reverse side Part II to provide an audit trail of incidents/occurrences. c. Reconcile assigned/attached strength of the unit against rosters, unit manning reports and other strength related documents. d. Recording of other personnel management data not otherwise shown elsewhere; e.g., local address, phone number for emergency and alert purposes. e. May be used as a substitute for the Personnel Action, DA Form 4187 as an evidentiary document in court-martial proceedings. Mandatory disclosure of local address, telephone number, and name and address of next-of-kin is required for emergency notification. Failure to disclose these data could result in delayed notification of emergency to the soldier and/or next-of-kin.				
PART I					
ORGANIZATION (UPC) w049aa					
UNIT/STATION U.S. Army Research Institute					
1. NAME (Last, first, middle) Troncon, Dennis C.	2. SSN 256-82-6296	3. GRADE & PAY GRADE 03	4. BLOOD TYPE A+		
5. DUTY ASSIGNMENT Adj	6. DUTY PHONE NUMBER (202) 555-8865	7. LOCAL ADDRESS (Include ZIP Code) 6405 Bruketree Rd Springfield, VA 22015	8. LOCAL PHONE NO. 555-5922		
9. NEXT OF KIN (Name and address) (Include ZIP Code) Mr. & Mrs. M.D. Troncon, 2933 Keene Valley Road, Blake, VA 22014			10. HOME OF RECORD Burke, VA		
11. PLACE OF BIRTH Burke, VA		12. HIGHEST AWARD(S) ARCOM, GCM			
13a. SQT PRIMARY (Score and date) N/A		13b. SQT SECONDARY (Score and date)			
14.	15.	16.	17.		
REMARKS					
COMMANDER'S OR AUTHORIZED REPRESENTATIVE'S GRADE, NAME AND INITIALS					
GRADE	NAME	INITIALS	GRADE	NAME	INITIALS
CERTIFICATE					
I certify that the initials appearing above opposite the name and on the reverse side of this form are those of myself as Commander/ designated Bn PAC representative or my authorized representatives. I further certify that the entry on the reverse side as initialed is a true statement as pertains to the individual indicated hereon for the reporting period.					
COMMANDER	TENURE DATES	COMMANDER	TENURE DATES		
COMMANDER	TENURE DATES	COMMANDER	TENURE DATES		
COMMANDER	TENURE DATES	COMMANDER	TENURE DATES		

DA FORM 2475-2
1 OCT 77

EDITION OF 1 JAN 78 AND DA FORM 2475-2R - PRIVACY ACT STATEMENT, 26 SEP 76 ARE OBSOLETE.

APPENDIX A

[illegible]

Note 1. P=Processed U=Unprocessed

U.S. G.P.O. 1977-260-810 8050

APPENDIX B

AN EXAMPLE OF DEPARTURE TRANSACTION RECORDS

BEFORE COMPLETING THIS FORM, SEE PRIVACY ACT STATEMENT ON REVERSE.

NAME (Last, first, middle initial) (Print or type)		GRADE		BRANCH	
SMITH, James G.		03		M1	
SIGNATURE		DATE			
		22 August 1978			
SOCIAL SECURITY NUMBER	IN		OUT		
747-61-8121	DATE	TIME	DATE	TIME	
			780822	0845	
HOME STATION AND ORGANIZATION			AUTHORITY (SO, TO, type of pass)		
Co F, 2d Sch Bn, HQ Sch Bde USAICS Ft. Huachuca, AZ 85613			Orders 85-67		
TEMPORARY ADDRESS AND TELEPHONE NUMBER					
3335 Chatham Rd, Atlanta, GA (404) 555-9355					
DESTINATION AND PURPOSE		DATE DUE TO RETURN		STATUS AND LENGTH OF STAY	
US Army Research Inst Alexandria, VA 22333 Reassignment (pdg)		N/A		N/A	

DA Form 647-1
1 May 76

Replaces DA Form 647-1, Dec 70
and DA Form 647-1R, (PAS),
Sep 75, which are obsolete.

PERSONNEL REGISTER
For use of this form, see AR 210-10, proponent
agency is MILPERCEN.

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APPENDIX B

Department of the Army
US Army Military Personnel Center
Ft. Huachuca, AZ 85613

REASSIGNMENT WITHOUT OVERSEA TRAVEL

Orders 85-67

SMITH, James G., 747-61-8121, CPT Co F, 2d Sch Bn, HQ Sch Bde, USAICS
(W1E81T L) Ft Huachuca, AZ 85613, M1

You will proceed on permanent change of station as indicated.

Assigned to: US Army Research Institute (wo49aa), Alexandria, VA 22333

Reporting date: 25 Aug 78

Additional instructions: None

FOR ARMY USE

Auth: FONECON MAJ Mitchell, HQ DA DAPC-OPF-M Alexandria, VA and Ms Echols Stu Par,
HQ, Ft. Huachuca, AZ

Asigd to mgt dsg: 25 Apr 77

Control specialty: S1A350000

PMOS/PSSI: N/A

Pers con no: SF-QK-07-J-0003-78

Enl/REENLB indic: N/A

MDC 2b

PPD: N/A

PEBD: NA

Proj Specialty: 360000000

Format: 410

Lv. Auth: 2 days

FOR THE COMMANDER

JOHN D. WELCH
CPT, GS

APPENDIX B

REQUEST AND AUTHORITY FOR LEAVE				
For use of this form, see AR 630-5; the proponent agency is US Army Military Personnel Center. (See Instructions on Reverse)				
PART - I				
1. NAME (Last, First, Middle) Smith, James G.	2. SOCIAL SECURITY NO. 747-61-8121	3. PAY GRADE 03	4. DATE 20 Aug 78	5. CONTROL NO.
6. ORGANIZATION AND STATION Co F, 2d Sch Bn, HQ Sch Bde USAICS Ft. Huachuca, AZ 85613	7. TYPE OF ABSENCE a. <input checked="" type="checkbox"/> ORDINARY LEAVE b. <input type="checkbox"/> OTHER (Specify)		8. DATES a. FROM b. TO	
	9. NO. OF DAYS LEAVE 2	10. NO. OF DAYS ACCRUED LEAVE 10	11. NO. OF DAYS ADVANCED LEAVE 0	12. NO. OF DAYS EXCESS LEAVE 0
13. LEAVE ADDRESS (Include ZIP Code and Telephone No.) 2335 Chatham Rd Atlanta, GA 30305 (404) 237-9355	14. SIGNATURE OF REQUESTOR		15. SUPERVISOR RECOMMENDATION <input checked="" type="checkbox"/> APPROVAL <input type="checkbox"/> DISAPPROVAL SIGNATURE	
16. NAME, TITLE, ORGANIZATION OF APPROVING AUTHORITY V.A. Brown, CPT, M1, Commander, Co F, 2nd Sch Bn			17. SIGNATURE OF APPROVING AUTHORITY	
18. DATE/TIME OF DEPARTURE	19. NAME/TITLE OF AUTHENTICATING AUTHORITY		20. SIGNATURE OF AUTHENTICATING AUTHORITY	
21. EXTENSION (No. of days and date approved) APPROVING AUTHORITY				
22. DATE/TIME OF RETURN	23. NAME/TITLE OF AUTHENTICATING AUTHORITY		24. SIGNATURE OF AUTHENTICATING AUTHORITY	
PART - II				
APPLICABLE TO AUTHORIZED TRAVEL ONLY				
25. SO. LO. DA FORM 662 OR AUTHORITY FOR TRAVEL				
26. INSTRUCTIONS FOR SERVICING STATION/ORGANIZATION (APOE, APOD, TDY Station, Others) DATE TIME STAMP WHEN SERVICE MEMBER ARRIVES/DEPARTS YOUR STATION/ORGANIZATION				
a. ARRIVE STATION 1	b. DEPART STATION 1	c. ARRIVE STATION 2	d. DEPART STATION 2	
e. ARRIVE STATION 3	f. DEPART STATION 3	g. ARRIVE STATION 4	h. DEPART STATION 4	
27. DATE/TIME OF ARRIVAL	28. NAME OF GAINING/PARENT ORGANIZATION		29. SIGNATURE OF AUTHENTICATING AUTHORITY	
30. REMARKS:				

DA FORM 31
1 AUG 75

REPLACES EDITION OF 1 OCT 73, WHICH WILL BE USED.

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ORIGINAL

APPENDIX C. AN EXAMPLE OF GRADE CHANGE TRANSACTION RECORDS

DEPARTMENT OF THE ARMY

US Army Research Institute for the Behavioral and Social Sciences
5001 Eisenhower Avenue, Alexandria, VA 22333

ORDERS 20-1

WOLF, ERNEST, 444-32-1198, PV2, 22nd MP Co, 4 Bn, 1st Trng Bde
(WVHBBB) Ft. Eustis, VA 26302

You are promoted to grade shown. Promotion is made in the MOS shown below and will be designated as your primary MOS on the effective date of promotion. Promotion is not valid if you are not in a promotable status on the effective date of promotion.

Grade promoted to: PFC
How acquired: D
MOS: 95b10
Additional Skill Identifier code: 20
Effective date: 780601
Date of rank: 780623
Authority: Order 20-1
Additional instructions: None
Format: 302
Remarks: PMOS how acquired: D

FOR THE COMMANDER:

THOMAS A. MITCHELL
CPT, GS

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APPENDIX D. AN EXAMPLE OF ARRIVAL TRANSACTION RECORDS

Department of the Army
U.S. Army Military Personnel Center
Ft. Hood, TX 36901

Orders 29-1

GLASS Martin R., 599-31-2563, SP4 A Co 5th Bn, 1 Bde(SPT) (AAC-C07 L)
Ft. Hood, Tx 76544

You will proceed on permanent change of station as indicated.

Assigned to: B Co 2Bn 2 Bde (oboz11) Ft Myer, Washington, D.C.
Reporting Date: 780704
Additional instructions: None

FOR ARMY USE

Auth: Order 81-91, dated 2 July 1978
Asgd to mgt dsg: 76520
Pers con no: SF-QK-07-50007-78
MDC: 2b
PEBD: 2 June 1978
Format: 410
Remarks: Position Number: bt16

Control specialty: N/A
PMOS/PSSI: N/A
Enl/REENLB indic:
PPD: N/A
Proj speciality: N/A

FOR THE COMMANDER

ROBERT E. WALKER
MAJ, GS

PRECEDING PAGE BLANK-NOT FILLED

APPENDIX D

BEFORE COMPLETING THIS FORM, SEE PRIVACY ACT STATEMENT ON REVERSE.

NAME (Last, first, middle initial) (Print or type)		GRADE		BRANCH	
Glass, Martin R.		SP4			
SIGNATURE		DATE			
		4 July 1978			
SOCIAL SECURITY NUMBER		IN		OUT	
599-31-2563		DATE	TIME	DATE	TIME
		780704	1700		
HOME STATION AND ORGANIZATION			AUTHORITY (SO, TO, type of pass)		
Ac, 5th Bn, 1 Bdc (SPT) Ft. Hood, TX 76544			Orders 29-1		
TEMPORARY ADDRESS AND TELEPHONE NUMBER					
312 Old Nestor Des Moines, IO (515) 555-6101					
DESTINATION AND PURPOSE		DATE DUE TO RETURN		STATUS AND LENGTH OF STAY	
B Co 2 Bn Ft. Myer, Wash D.C. (pdg)		N/A		N/A	

DA Form 647-1
1 May 76

Replaces DA Form 647-1, Dec 70
and DA Form 647-1 R, (PAS),
Sep 75, which are obsolete.

PERSONNEL REGISTER
For use of this form, see AR 210-10, proponent
agency is MILPERCEN.

APPENDIX D

REQUEST AND AUTHORITY FOR LEAVE				
For use of this form, see AR 630-5; the proponent agency is US Army Military Personnel Center. (See Instructions on Reverse)				
PART - I				
1. NAME (Last, First, Middle) Glass, Martin R.	2. SOCIAL SECURITY NO. 599-31-2563	3. PAY GRADE SP4	4. DATE 2 July 1978	5. CONTROL NO.
6. ORGANIZATION AND STATION	7. TYPE OF ABSENCE a. <input checked="" type="checkbox"/> ORDINARY LEAVE b. <input type="checkbox"/> OTHER (Specify)		8. DATES a. FROM 2 July 1978 b. TO 3 July 1978	
	9. NO. OF DAYS LEAVE 2	10. NO. OF DAYS ACCRUED LEAVE 6	11. NO. OF DAYS ADVANCED LEAVE 0	12. NO. OF DAYS EXCESS LEAVE 0
13. LEAVE ADDRESS (Include ZIP Code and Telephone No.) 312 Old Nestor Dr. Des Moines, IO - 50311 (515) 555-6101	14. SIGNATURE OF REQUESTOR		15. SUPERVISOR RECOMMENDATION <input checked="" type="checkbox"/> APPROVAL <input type="checkbox"/> DISAPPROVAL SIGNATURE	
16. NAME, TITLE, ORGANIZATION OF APPROVING AUTHORITY D.M. Cambell, CPT, A Co, 5th Bn, 1 Bde (SPT) Ft. Hood, TX 76544			17. SIGNATURE OF APPROVING AUTHORITY	
18. DATE/TIME OF DEPARTURE	19. NAME/TITLE OF AUTHENTICATING AUTHORITY		20. SIGNATURE OF AUTHENTICATING AUTHORITY	
21. EXTENSION (No. of days and date approved) APPROVING AUTHORITY				
22. DATE/TIME OF RETURN	23. NAME/TITLE OF AUTHENTICATING AUTHORITY		24. SIGNATURE OF AUTHENTICATING AUTHORITY	
PART - II				
APPLICABLE TO AUTHORIZED TRAVEL ONLY				
25. SO. LO. DA FORM 862 OR AUTHORITY FOR TRAVEL				
26. INSTRUCTIONS FOR SERVICING STATION/ORGANIZATION (APOE, APOD, TDY Station, Others) DATE/TIME STAMP WHEN SERVICE MEMBER ARRIVES/DEPARTS YOUR STATION/ORGANIZATION				
a. ARRIVE STATION 1	b. DEPART STATION 1	c. ARRIVE STATION 2	d. DEPART STATION 2	
e. ARRIVE STATION 3	f. DEPART STATION 3	g. ARRIVE STATION 4	h. DEPART STATION 4	
27. DATE/TIME OF ARRIVAL	28. NAME OF GAINING/PARENT ORGANIZATION		29. SIGNATURE OF AUTHENTICATING AUTHORITY	
30. REMARKS:				

DA FORM 31
1 AUG 75

REPLACES EDITION OF 1 OCT 73, WHICH WILL BE USED.

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INDIVIDUAL 2

DISTRIBUTION

ARI Distribution List

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 1 HQDA (SGRD-ID)
 1 HQDA (DAMI-DOT-C)
 1 HQDA (DAPC-PMZ-A)
 1 HQDA (DACH-PPZ-A)
 1 HQDA (DAPE-HRE)
 1 HQDA (DAPE-MPO-C)
 1 HQDA (DAPE-DWI)
 1 HQDA (DAPE-HRL)
 1 HQDA (DAPE-CPS)
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 1 HQDA (DAPC-PAS-A)
 1 HQDA (DUSA-OR)
 1 HQDA (DAMO-ROR)
 1 HQDA (DASG)
 1 HQDA (DA10-PI)
 1 Chief, Consult Div (DA-OTSG), Adelphi, MD
 1 Mil Asst, Hum Res, ODDR&E, OAD (E&LS)
 1 HQ USARAL, APO Seattle, ATTN: ARAGP-R
 1 HQ First Army, ATTN: AFKA-OI-T
 2 HQ Fifth Army, Ft Sam Houston
 1 Dir, Army Stf Studies Ofc, ATTN: OAVCSA (DSP)
 1 Ofc Chief of Stf, Studies Ofc
 1 DCSPER, ATTN: CPS/OCF
 1 The Army Lib, Pentagon, ATTN: RSB Chief
 1 The Army Lib, Pentagon, ATTN: ANRAL
 1 Ofc, Asst Sect of the Army (R&D)
 1 Tech Support Ofc, OJCS
 1 USASA, Arlington, ATTN: IARD-T
 1 USA Rsch Ofc, Durham, ATTN: Life Sciences Dir
 2 USARIEM, Natick, ATTN: SGRD-UE-CA
 1 USATTC, Ft Clayton, ATTN: STETC-MO-A
 1 USAIMA, Ft Bragg, ATTN: ATSU-CTD-OM
 1 USAIMA, Ft Bragg, ATTN: Marquat Lib
 1 US WAC Ctr & Sch, Ft McClellan, ATTN: Lib
 1 US WAC Ctr & Sch, Ft McClellan, ATTN: Tng Dir
 1 USA Quartermaster Sch, Ft Lee, ATTN: ATSM-TE
 1 Intelligence Materiel Dev Ofc, EWL, Ft Holabird
 1 USA SE Signal Sch, Ft Gordon, ATTN: ATSO-EA
 1 USA Chaplain Ctr & Sch, Ft Hamilton, ATTN: ATSC-TE-RO
 1 USATSCH, Ft Eustis, ATTN: Educ Advisor
 1 USA War College, Carlisle Barracks, ATTN: Lib
 2 WRAIR, Neuropsychiatry Div
 1 DLI, SDA, Monterey
 1 USA Concept Anal Agcy, Bethesda, ATTN: MOCA-MR
 1 USA Concept Anal Agcy, Bethesda, ATTN: MOCA-JF
 1 USA Arctic Test Ctr, APO Seattle, ATTN: STEAC-PL-MI
 1 USA Arctic Test Ctr, APO Seattle, ATTN: AMSTE-PL-TS
 1 USA Armament Cmd, Redstone Arsenal, ATTN: ATSK-TEM
 1 USA Armament Cmd, Rock Island, ATTN: AMSAR-TDC
 1 FAA-NAFEC, Atlantic City, ATTN: Library
 1 FAA-NAFEC, Atlantic City, ATTN: Human Engr Br
 1 FAA Aeronautical Ctr, Oklahoma City, ATTN: AAC-44D
 2 USA Fld Arty Sch, Ft Sill, ATTN: Library
 1 USA Armor Sch, Ft Knox, ATTN: Library
 1 USA Armor Sch, Ft Knox, ATTN: ATSB-DI-E
 1 USA Armor Sch, Ft Knox, ATTN: ATSB-DT-TP
 1 USA Armor Sch, Ft Knox, ATTN: ATSB-CD-AD
 2 HQUSACDEC, Ft Ord, ATTN: Library
 1 HQUSACDEC, Ft Ord, ATTN: ATEC-EX-E-Hum Factors
 2 USAEC, Ft Benjamin Harrison, ATTN: Library
 1 USAPACDC, Ft Benjamin Harrison, ATTN: ATCP-HR
 1 USA Comm-Elect Sch, Ft Monmouth, ATTN: ATSN-EA
 1 USAEC, Ft Monmouth, ATTN: AMSEL-CT-HDP
 1 USAEC, Ft Monmouth, ATTN: AMSEL-PA-P
 1 USAEC, Ft Monmouth, ATTN: AMSEL-SI-CB
 1 USAEC, Ft Monmouth, ATTN: C, Fac Dev Br
 1 USA Materials Sys Anal Agcy, Aberdeen, ATTN: AMXS-P
 1 Edgewood Arsenal, Aberdeen, ATTN: SAREA-BL-H
 1 USA Ord Ctr & Sch, Aberdeen, ATTN: ATSL-TEM-C
 2 USA Hum Engr Lab, Aberdeen, ATTN: Library/Dir
 1 USA Combat Arms Tng Bd, Ft Benning, ATTN: Ad Supervisor
 1 USA Infantry Hum Rsch Unit, Ft Benning, ATTN: Chief
 1 USA Infantry Bd, Ft Benning, ATTN: STEBC-TE-T
 1 USASMA, Ft Bliss, ATTN: ATSS-LRC
 1 USA Air Def Sch, Ft Bliss, ATTN: ATSA-CTD-ME
 1 USA Air Def Sch, Ft Bliss, ATTN: Tech Lib
 1 USA Air Def Bd, Ft Bliss, ATTN: FILES
 1 USA Air Def Bd, Ft Bliss, ATTN: STEBD-PO
 1 USA Cmd & General Stf College, Ft Leavenworth, ATTN: Lib
 1 USA Cmd & General Stf College, Ft Leavenworth, ATTN: ATSW-SE-L
 1 USA Cmd & General Stf College, Ft Leavenworth, ATTN: Ed Advisor
 1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: DepCdr
 1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: CCS
 1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: ATCASA
 1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: ATCACO-E
 1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: ATCACC-CI
 1 USAECOM, Night Vision Lab, Ft Belvoir, ATTN: AMSEL-NV-SD
 3 USA Computer Sys Cmd, Ft Belvoir, ATTN: Tech Library
 1 USAMERDC, Ft Belvoir, ATTN: STSFB-DQ
 1 USA Eng Sch, Ft Belvoir, ATTN: Library
 1 USA Topographic Lab, Ft Belvoir, ATTN: ETL-TD-S
 1 USA Topographic Lab, Ft Belvoir, ATTN: STINFO Center
 1 USA Topographic Lab, Ft Belvoir, ATTN: ETL-GSL
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: CTD-MS
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATS-CTD-MS
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-TE
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-TEX-GS
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-CTS-OR
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-CTD-DT
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-CTD-CS
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: DAS/STD
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-TEM
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: Library
 1 CDR, HQ Ft Huachuca, ATTN: Tech Ref Div
 2 CDR, USA Electronic Prvg Grd, ATTN: STEEP-MT-S
 1 HQ, TCATA, ATTN: Tech Library
 1 HQ, TCATA, ATTN: AT CAT-OP-Q, Ft Hood
 1 USA Recruiting Cmd, Ft Sheridan, ATTN: USARCPM-P
 1 Senior Army Adv., USAFAGOD/TAC, Elgin AF Aux Fld No. 9
 1 HQ, USARPAC, DCSPER, APO SF 96558, ATTN: GPPE-SE
 1 Stimson Lib, Academy of Health Sciences, Ft Sam Houston
 1 Marine Corps Inst., ATTN: Dean-MCI
 1 HQ, USMC, Commandant, ATTN: Code MTMT
 1 HQ, USMC, Commandant, ATTN: Code MPI-20-28
 2 USCG Academy, New London, ATTN: Admission
 2 USCG Academy, New London, ATTN: Library
 1 USCG Training Ctr, NY, ATTN: CO
 1 USCG Training Ctr, NY, ATTN: Educ Svc Ofc
 1 USCG, Psychol Res Br, DC, ATTN: GP 1/82
 1 HQ Mid-Range Br, MC Det, Quantico, ATTN: P&S Div

1 US Marine Corps Liaison Ofc. AMC, Alexandria, ATTN: AMCGS-F
 1 USATRADOC, Ft Monroe, ATTN: ATRO-ED
 6 USATRADOC, Ft Monroe, ATTN: ATRR-AD
 1 USATRADOC, Ft Monroe, ATTN: ATTS-EA
 1 USA Forces Cmd, Ft McPherson, ATTN: Library
 2 USA Aviation Test Bd, Ft Rucker, ATTN: STEBG-PO
 1 USA Agcy for Aviation Safety, Ft Rucker, ATTN: Library
 1 USA Agcy for Aviation Safety, Ft Rucker, ATTN: Educ Advisor
 1 USA Aviation Sch, Ft Rucker, ATTN: PO Drawer O
 1 HQUSA Aviation Sys Cmd, St Louis, ATTN: AMSAV-ZDR
 2 USA Aviation Sys Test Act., Edwards AFB, ATTN: SAVTE-T
 1 USA Air Def Sch, Ft Bliss, ATTN: ATSA TEM
 1 USA Air Mobility Rsch & Dev Lab, Moffett Fld, ATTN: SAVOL-AS
 1 USA Aviation Sch, Res Trng Mgt, Ft Rucker, ATTN: ATST-T-RTM
 1 USA Aviation Sch, CO, Ft Rucker, ATTN: ATST-D-A
 1 HQ DARCOM, Alexandria, ATTN: AMXCD-TL
 1 HQ DARCOM, Alexandria, ATTN: CDR
 1 US Military Academy, West Point, ATTN: Serials Unit
 1 US Military Academy, West Point, ATTN: Ofc of Milt Ldrshp
 1 US Military Academy, West Point, ATTN: MAOR
 1 USA Standardization Gp, UK, FPO NY, ATTN: MASE-GC
 1 Ofc of Naval Rsch, Arlington, ATTN: Code 452
 3 Ofc of Naval Rsch, Arlington, ATTN: Code 458
 1 Ofc of Naval Rsch, Arlington, ATTN: Code 450
 1 Ofc of Naval Rsch, Arlington, ATTN: Code 441
 1 Naval Aerosp Med Res Lab, Pensacola, ATTN: Acous Sch Div
 1 Naval Aerosp Med Res Lab, Pensacola, ATTN: Code L51
 1 Naval Aerosp Med Res Lab, Pensacola, ATTN: Code L5
 1 Chief of NavPers, ATTN: Pers-OR
 1 NAVAIRSTA, Norfolk, ATTN: Safety Ctr
 1 Nav Oceanographic, DC, ATTN: Code 6251, Charts & Tech
 1 Center of Naval Anal, ATTN: Doc Ctr
 1 NavAirSysCom, ATTN: AIR-5313C
 1 Nav BuMed, ATTN: 713
 1 NavHelicopterSubSqua 2, FPO SF 96601
 1 AFHRL (FT) Williams AFB
 1 AFHRL (TT) Lowry AFB
 1 AFHRL (AS) WPAFB, OH
 2 AFHRL (DOJZ) Brooks AFB
 1 AFHRL (DOJN) Lackland AFB
 1 HQUSAF (INYSO)
 1 HQUSAF (DPXXA)
 1 AFVTG (RD) Randolph AFB
 3 AMRL (HE) WPAFB, OH
 2 AF Inst of Tech, WPAFB, OH, ATTN: ENE/SL
 1 ATC (XPTD) Randolph AFB
 1 USAF AeroMed Lib, Brooks AFB (ISUL-4), ATTN: DOC SEC
 1 AFOSR (INL), Arlington
 1 AF Log Cmd, McClellan AFB, ATTN: ALC/DPCRB
 1 Air Force Academy, CO, ATTN: Dept of Bel Scn
 5 NavPers & Dev Ctr, San Diego
 2 Navv Med Neuropsychiatric Rsch Unit, San Diego
 1 Nav Electronic Lab, San Diego, ATTN: Res Lab
 1 Nav TrngCen, San Diego, ATTN: Code 9000-Lib
 1 NavPostGraSch, Monterey, ATTN: Code 55Aa
 1 NavPostGraSch, Monterey, ATTN: Code 2124
 1 NavTrngEquipCtr, Orlando, ATTN: Tech Lib
 1 US Dept of Labor, DC, ATTN: Manpower Admin
 1 US Dept of Justice, DC, ATTN: Drug Enforce Admin
 1 Nat Bur of Standards, DC, ATTN: Computer Info Section
 1 Nat Clearing House for MH-Info, Rockville
 1 Denver Federal Ctr, Lakewood, ATTN: BLM
 12 Defense Documentation Center
 4 Dir Psych, Army Hq, Russell Ofcs, Canberra
 1 Scientific Advsr, Mil Bd, Army Hq, Russell Ofcs, Canberra
 1 Mil and Air Attache, Austrian Embassy
 1 Centre de Recherche Des Facteurs Humains de la Defense Nationale, Brussels
 2 Canadian Joint Staff, Washington
 1 C Air Staff, Royal Canadian AF, ATTN: Pers Std Anal Br
 3 Chief, Canadian Def Rsch Staff, ATTN: C CRDSIW
 4 British Def Staff, British Embassy, Washington
 1 Def & Civil Inst of Enviro Medicine, Canada
 1 AIR CRESS, Kensington, ATTN: Info Sys Br
 1 Militærpsykologisk Tjeneste, Copenhagen
 1 Military Attache, French Embassy, ATTN: Doc Sec
 1 Medecin Chef, C.E.R.P.A.-Arsenal, Toulon/Naval France
 1 Prin Scientific Off, Appl Hum Engr Rsch Div, Ministry of Defense, New Delhi
 1 Pers Rsch Ofc Library, AKA, Israel Defense Forces
 1 Ministeris van Defensie, DOOP/KL Afd Sociaal Psychologische Zaken, The Hague, Netherlands